Short Communication

Inflammatory myofibroblastic tumour: A case report and a clinical update

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ABSTRACT

The Inflammatory myofibroblastic tumor (IMT) is a heterogeneous group of rare lesions consisting predominantly of inflammatory cells and myofibroblastic spindle cells. Head and neck IMTs account for 14 to 18% of extra-pulmonary IMTs [lungs being the most commonly affected regions]. On account of its ambiguous clinical presentation, an IMT needs to be differentiated from other infectious, granulomatous, autoimmune and neoplastic lesions on the basis of histopathologic findings and immunohistochemical analysis. In this article, we report a case of IMT that presented in the anterior mandible that was treated by peripheral resection. Follow-up at 1 year showed satisfactory healing and no signs of recurrence. A special emphasis has been placed on the disputed nosology of this lesion and the latest therapeutic modalities.

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1. Introduction

The Inflammatory myofibroblastic tumor (IMT) is a heterogeneous group of rare lesions consisting predominantly of inflammatory cells and myofibroblastic spindle cells.¹ The lung [most common site] and the gastro-intestinal system are the principally affected sites. Though rare in the maxillofacial region; it has been reported in the epiglottis, endolarynx, parapharyngeal space, maxillary sinus, orbits, submandibular region and oral cavity.^{1–4}

On account of its ambiguous clinical presentation, an IMT needs to be differentiated from other infectious, granulomatous, autoimmune and malignant lesions on the basis of histopathologic findings and immunohistochemical analysis. The treatment modalities that have been suggested in the literature are steroid therapy, surgical excision and radiotherapy alone or in combination [based on the history of recurrence and location, extent and behaviour of the tumour].⁵

In this article, we report a case of IMT that presented in the anterior mandible of an adult male. The lesion was treated by peripheral resection and follow-up at 1 year showed satisfactory healing and no signs of recurrence.

2. Case report

A 35 year old male was referred to the Department of Oral & Maxillofacial Surgery for evaluation and treatment of a tumor of the lower jaw. The patient first noticed the swelling 15 years ago in the right body and para-symphiseal region of the mandible which gradually increased in size and eventually crossed the midline to involve the left para-symphiseal region as well. The patient did not have any previous radiographic records. The patient also gave a history of a previous biopsy being performed under local anaesthesia. The histopathological report was suggestive of inflammatory granulation tissue.

Extra-oral examination revealed a well defined swelling in the region of the anterior mandible and right hemi-mandible. Intra-oral examination revealed a large, expansile swelling involving the right body and bilateral para-symphiseal regions of the mandible. The teeth present in the affected alveolar region were displaced. The mucosa over the swelling was ulcerated on account of trauma from the maxillary teeth. On palpation, the tumour had a firm elastic consistency and was non-tender. The tongue was displaced to the posterior part of the oral cavity. The remainder of the physical examination was non-contributory and regional lymph nodes were non-palpable (Fig. 1).

The CBCT scan revealed a lytic expansile mass in the anterior and right posterior mandible. Expansion and perforation of the buccal cortical plate was noted with displacement of the associated teeth. There was loss of alveolar bone in the region occupied by the

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Fig. 1. Clinical picture: Large, exophytic ulcerated growth of the anterior mandible.

Fig. 3. The H & E stained section shows myofibroblast cells and chronic inflammatory cells composed predominantly of plasma cells with areas of myxomatous degeneration (H & E, $\times 100$).

swelling and only basal bone was found to be present (Fig. 2). The chest X-ray did not reveal any abnormalities and hence pulmonary IMT was ruled out.

An incisional biopsy was repeated under local anaesthesia. The histopathological report was suggestive of inflammatory granulation tissue. Immunohistochemical staining proved it to be an inflammatory myofibroblastic tumour.

Marginal resection of the tumour was performed under general anaesthesia. Approximately 1.5 cm of healthy bone was preserved along the inferior border of mandible. The patient recovered with an uneventful post-operative course. Further prosthetic rehabilitation of the patient was planned for a later date. No recurrences or surgery related complications have been noted during the follow-up period of 1 year.

The final histological examination of the excised sample revealed a circumscribed tumor mass covered by atrophied para-keratinized stratified squamous epithelium. The tumor mass was composed of spindle shaped myofibroblast cells and chronic

inflammatory cells [predominantly plasma cells]. Areas of myxomatous degeneration were also seen (Fig. 3). The tumor cells were strongly positive for immunohistochemical markers Smooth Muscle Actin (SMA), Vimentin and CD 68. The tumour cells were negative for the immunohistochemical marker Anaplastic Lymphoma Kinase (ALK). Based on the above findings and similar reports in the literature, a final pathological diagnosis of IMT was made.^{1,3}

3. Discussion

In 1939, Brunn and colleagues first described the IMT when it occurred in the lung. The IMT has an uncertain pathogenesis, a wide range of clinical and histological presentations and a potential for recurrence. It was for the above reasons that this clinical entity had a disputed nosology and a controversial

Fig. 2. The CBCT scan revealed a lytic expansile mass in the anterior and right posterior mandible.

Table 1

The confusing terminology that plagued IMT is well described in the table below.

Disputed Nosology	Characteristic Feature
1. Inflammatory Pseudo-tumour/Post-inflammatory tumour <ul style="list-style-type: none"> • Inflammatory or • Post Inflammatory • Pseudo-tumour 	<ul style="list-style-type: none"> • Clinical 'reactive' nature of the lesion. • Histological presence of a large number of inflammatory cells. • Clinical and radiographic behaviour which is similar to that of a malignancy.² • Tumors that have been documented to arise following irradiation for oral squamous cell carcinoma in the radiation field and along peripheral sites.⁶
2. Benign vs. Malignant	<ul style="list-style-type: none"> • Up to 37% recurrence observed in literature.² • Discovery of cytogenetic aberrations e.g. anaplastic lymphoma tyrosine kinase (ALK) gene rearrangements.² • Clonal population of cells. • Oncogenic protein over expression ALK, p53, bcl-2, Ki 67.⁶
3. Inflammatory Myofibroblastic Tumour	<ul style="list-style-type: none"> • Presence of spindle cells with myofibroblastic differentiation.
4. Plasma Cell Granuloma, Plasmocytoma	<ul style="list-style-type: none"> • Presence of plasma cells predominantly.
5. Histiocytoma, Fibroxanthoma Xanthogranuloma, Xanthoma, Xanthomatous Pseudotumour	<ul style="list-style-type: none"> • Presence of fat filled mononuclear cells.

treatment plan (Table 1). In 1994, the WHO decided to settle on IMT as the universal terminology to address this lesion and defined it as an intermediate soft tissue tumor comprising of spindle cells that exhibit myofibroblast differentiation and numerous inflammatory cells, plasma cells and/or lymphocytes.¹

The aetiology and pathogenesis of IMT are unclear and are as listed below.⁴

- ALK gene rearrangements [positive for more than half of all IMTs]
- Viral infections like Epstein-Barr virus, Human Immunodeficiency Virus, Human Herpes Virus-8 [less common in the head and neck region],
- IgG4 Related Disease [more common in the head and neck region],
- Trauma, chronic inflammation and auto-immune diseases [indicative of the reactive nature of the lesion]

The overall prevalence of IMT is 0.04–0.7%.⁶ It can be further divided into the more common pulmonary variant and the less common extra-pulmonary variant. The pulmonary variant occurs more commonly in children and young individuals and has a more benign clinical course. The extra pulmonary variant affects older individuals [after the 2nd decade] and has a more aggressive clinical course.^{1,7}

The upper aero-digestive tract in the head and neck region comprises of 11% of all extra pulmonary cases with the larynx being most commonly affected.^{3,5,8} The remaining sites in the head and neck region comprise less than 5% of all extra pulmonary cases with the orbits being most commonly affected.^{3,5,8} The presentation of IMTs in the oral cavity is very rare with an incidence of 0.0012% reported in the literature.⁷ The buccal mucosa and the mandible are the more commonly involved sites.^{9,10}

The differential diagnosis of IMT is primarily histological and includes nodular fasciitis, solitary fibrous tumor, benign fibrous histiocytoma, calcifying fibrous tumour, fibrosarcoma, follicular tumor, myofibroma, dendritic cell tumor, leiomyosarcoma and odontogenic tumours of mesenchymal origin [odontogenic fibroma, odontogenic myxoma and odontogenic fibromyxoma].^{9,10}

IMTs can be treated by surgical excision, curettage, steroid therapy, radical surgery and radiotherapy.^{11,4} Biopsies may have to be performed multiple times on account of its variable histological presentation and the final diagnosis is one that is based on exclusion and is further confirmed on immunohistochemical

staining.^{2,5} Malignant transformation ranges from 8% to 18% and metastasis has been observed in less than 5% of the cases. The mortality of extra pulmonary IMTs is 4%.^{7,1} Surgical excision, the most commonly used modality, is associated with a local recurrence rate of up to 15%.^{1,11} Recently, surgical excision has been supplemented with CO2 laser light.⁴ Radiation, chemotherapy [cyclosporine, azathioprine, methotrexate and cyclophosphamide], ALK molecular targeted therapeutic drugs [crizotinib] and steroid therapy are used when the tumours are invasive, non-resectable, recurrent, show signs of malignancy/metastasis or when surgical margins are positive.⁴

The IMT is a rare benign pathology of the head and neck region that tends to mimic a malignancy on account of its aggressive clinical and radiographic features. Immunohistochemical analysis also aids in the differential diagnosis. Inability to properly diagnose this lesion may lead to unnecessarily aggressive surgical management [e.g. radical resection] and subsequent functional disability. Surgical resection is considered as the treatment of choice in most cases. However, on account of their vague biological behaviour it would be considered beneficial to keep such patients under close observation after treatment to rule out local recurrence and malignant transformations.

Conflict of interest

None.

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